

“Hot Tub Lung” Hypersensitivity Pneumonitis

What is Hot Tub Lung?

Hot Tub Lung is a specific form of hypersensitivity pneumonitis caused by the lung’s inflammatory (swelling) reaction to liquid or solid droplets in the air contaminated by bacteria or other infectious agents. Even though it is caused by infectious agents, Hot Tub Lung is not an infection. Instead, it is the body’s reaction to the bacteria that causes the disease. Some people have developed Hot Tub Lung related to contaminated water in whirlpools, swimming pools, spas, saunas, showers and humidifiers.

What are the symptoms of Hot Tub Lung?

The most common symptoms are cough and shortness of breath. These symptoms often occur soon after exposure to the contaminated water.

What causes Hot Tub Lung?

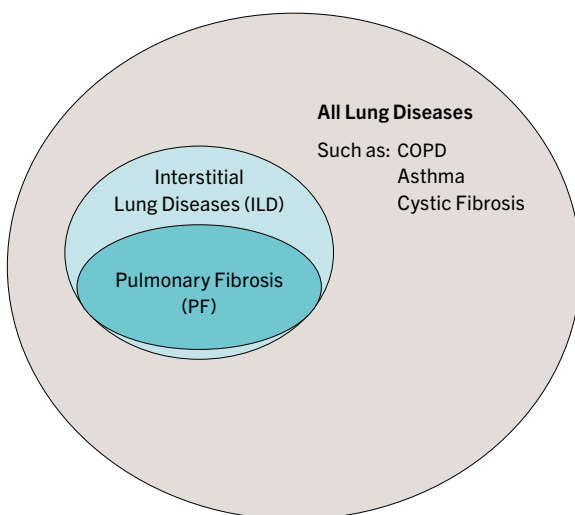
The most common class of bacteria that is associated with Hot Tub Lung is “non-tuberculous mycobacterium”, which does not cause tuberculosis, but can cause pulmonary disease. The most commonly reported specific type of non-tuberculous mycobacterium reported is called *Mycobacterium avium*. It is normal to find non-tuberculous mycobacteria in soil and water. It is only at high levels in specific environments such as hot tubs, swimming pools, and spas that the bacteria can cause Hot Tub Lung. Hot Tub Lung is not an infection and it is not contagious (cannot be spread from one person to the other).

What makes Hot Tub Lung different from other forms of PF?

Hot Tub Lung is a form of hypersensitivity pneumonitis, a type of interstitial lung disease caused by exposures. Hot Tub Lung can improve when the exposure is stopped and/or with corticosteroid medical treatment. This is different from patients with idiopathic pulmonary fibrosis who have scarring in their lung that does not improve.

How is Hot Tub Lung diagnosed?

The most important clue to diagnosing Hot Tub Lung is taking a good a history. A doctor or other health care provider will ask about usage of hot tubs, whirlpools, or time spent in other places where there is potential exposure to contaminated water. S/he will also ask if symptoms occur when or soon after the person is in these environments. If other individuals who are also in these settings have similar symptoms, that is another clue that the environment is the cause. CT scan (also known as CAT scan) patterns can suggest of hypersensitivity pneumonitis and are different from CT scans of patients with idiopathic pulmonary fibrosis.



TYPE OF PULMONARY FIBROSIS	CLUES THAT DOCTORS USE
Drug-induced	Prior or current use of amiodarone, nitrofurantoin, chemotherapy, methotrexate, or other drugs known to affect the lungs
Radiation-induced	Prior or current radiation treatment to the chest
Environmental (called hypersensitivity pneumonitis)	Exposure to mold, animals, or other triggers
Autoimmune (called connective tissue disease-related)	Joint inflammation, skin changes (particularly on the fingers and face), dry eyes or mouth, abnormal blood tests
Occupational (called pneumoconiosis)	Prior or current exposure to dusts, fibers, fumes, or vapors that can cause PF (such as asbestos, coal, silica, and others)
Idiopathic	When no cause can be identified

Doctors may do more invasive procedures such as a bronchoscopy where the doctor inserts a small tube into your lung to obtain biopsies and fluid specimens. Bronchoscopy specimens may show a specific type of inflammation called granulomatous inflammation. Rarely, the bacteria can be grown from the lung using the fluid or lung biopsy specimens from a bronchoscopy or the patient's sputum. Even more rarely, the bacteria can be grown from water itself but there are few laboratories that will accept those water specimens. Also, since non-tuberculous mycobacterium is everywhere, it is not known what a "high" level of nontuberculous mycobacterium is. The water is more frequently tested in situations where there are outbreaks.

My doctor said my CT scan (or biopsy) showed "Hot Tub Lung" What is that?

A CT Scan in Hot Tub Lung will frequently show small nodules (spots) and/or ground glass inflammation (shadows in the lung) all over the lung. This is different from the scarring pattern seen in idiopathic pulmonary fibrosis.

How is Hot Tub Lung treated?

Removal from exposure is the key to treatment. Sometimes treatment with corticosteroids is required. Antibiotic treatment for non-tuberculous mycobacterium is rarely given. Prevention is also important. Proper sanitation, ventilation and disinfection of the water are important.

Pulmonary rehabilitation, supplemental oxygen, smoking cessation, routine vaccinations (such as influenza and pneumonia vaccination) may be useful in some patients living with Hot Tub Lung.

You can learn more about supplemental oxygen at:

<https://www.pulmonaryfibrosis.org/life-with-pf/oxygen-therapy>

You can learn more about pulmonary rehabilitation at:

<https://www.pulmonaryfibrosis.org/life-with-pf/pulmonary-fibrosis-treatment-options>

Lung transplantation may be an appropriate treatment for some people living with Hot Tub Lung when scar tissue is present. Early evaluation for lung transplant is important because the process involves a series of appointments to provide the patient with information about transplantation and to determine if they are an appropriate candidate.

What is my prognosis?

Generally, people with Hot Tub Lung often have a type of hypersensitivity pneumonitis that is acute and inflammatory and will improve with either treatment or removal from exposure. But sometimes, chronic scarring (fibrosis) can build up.

Pulmonary fibrosis resulting from Hot Tub Lung can lead to lung failure (medically called "respiratory failure"), which is a life-threatening condition. No one can predict exactly how long you will live with Hot Tub Lung. Everyone is different. Your doctor can give you more detailed information about your prognosis.

Are there experimental therapies available?

Since the prognosis is good, generally there are experimental research opportunities available. You can search for research studies closest to you on our PFF Clinical Trial Finder: trials.pulmonaryfibrosis.org.

References

Hanak V, Kaira S, Aksamit TR, Hartman TE, Tazellar HD, Ryu JH. Hot tub lung: presenting features and clinical course of 21 patients. *Respir Med* 2006; 100(4): 610-5

Acknowledgements

The Pulmonary Fibrosis Foundation is thankful to the following for their assistance in writing and reviewing this fact sheet:

David J. Lederer, MD, MS
Former PFF Senior Medical Advisor, Education and Awareness

Mridu Gulati, MD, MPH
Yale Center Interstitial Lung Disease
New Haven, CT
PFF Exposure Working Group